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# SOUTHEASTERN BIOLOGY



Volume 52                      January, 2005                      Number 1

*ASB*      **ASB 66<sup>TH</sup> ANNUAL MEETING**      *ASB*  
**APRIL 13-16, 2005**

*ASB*      The University of North Alabama      *ASB*  
                                         Florence, Alabama

*ASB*      See Page 1 and Consult Website      *ASB*  
                                         <http://www.asb.appstate.edu/Preliminary2005.htm>



*ASB*      UNA Memorial Gardens and the Memorial Amphitheater      *ASB*

*The Official Publication of*  
**The Association of Southeastern Biologists**  
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## **SOUTHEASTERN BIOLOGY**

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### **PURPOSE**

The purpose of this association shall be to promote the advancement of biology as a science by encouraging research, the imparting of knowledge, the application of knowledge to the solution of biological problems, and the preservation of biological resources. The ASB has representation in Section G Committee of the AAAS. Varying types of membership are available to individuals and institutions. See inside back cover.

### **TIME AND PLACE OF FUTURE MEETINGS**

2005 April 13-16: Hosted by the University of North Alabama, Florence, Alabama.  
2006 March 29-31, April 1: Hosted by the University of Tennessee, Knoxville, Tennessee.  
2007 April 18-21: Hosted by the University of South Carolina, Columbia, South Carolina.  
2008 April: Hosted by Furman University, Greenville, South Carolina.

# **Association of Southeastern Biologists**

## **66<sup>th</sup> Annual Meeting April 13-16, 2005**

### **University of North Alabama Florence, Alabama**

The University of North Alabama and the entire Shoals area are excited about hosting the 66<sup>th</sup> Annual Meeting of ASB and would like to extend you a very warm welcome. The Shoals area has a rich music and recording history and has long been recognized as the "hit recording capital of the world." Such greats as Elvis Presley, Hank Williams, the Rolling Stones, Lynard Skynard, and Jimmy Buffett, just to name a few, have recorded hit songs in our studios. Additionally, Florence is the birthplace of W. C. Handy, the "father of the blues," and the Alabama Music Hall of Fame is located here in the Shoals. The Shoals area was the birthplace and home of Helen Keller, "America's first lady of courage." From her home, Ivy Green, she learned to read and teach Braille, then traveled throughout the world for the betterment of the deaf-blind and became the subject of the famed William Gibson's play "The Miracle Worker." The Shoals area also has much to offer from the natural wonders of the great Tennessee River and her many tributaries to museums, shops, and malls.

### **University of North Alabama**

The University of North Alabama is a comprehensive regional state university offering undergraduate and graduate degrees, and serving the educational needs of students through all appropriate means of delivery. With enrollment exceeding 5,900 students, the University shares the broad purpose of all institutions of higher learning for the discovery, preservation, and transmission of knowledge through teaching, research, and public service. Within this broad purpose, the University recognizes an obligation of service to the people and the needs of the state and the region. The University occupies the beautiful campus of over 130 acres in a residential section of Florence, Alabama. Florence is located just north of the Tennessee River and is the largest city in a four-city area that includes Tuscumbia, Sheffield and Muscle Shoals. The entire metropolitan area has a combined population of approximately 140,000 people. The University of North Alabama, established in 1830 as LaGrange College, became in 1872 the first state-supported teachers' college south of the Ohio River and one of the first coed colleges in the nation. The University of North Alabama has developed into a comprehensive regional university providing quality educational opportunities for students, with majors in four colleges—arts and sciences, business, education, and nursing and allied health. Graduate studies were introduced in 1957 with the establishment of master's degree programs in education, and have been characterized by continued expansion: a sixth-year program in education (1971), a master of business administration degree program (1975), a master of

science in criminal justice degree program (1994), and a master of arts in English degree program (1999).

## MEETING SITE

The meeting will be held at the **Florence Conference Center** on the banks of the Tennessee River. The Conference Center offers first-class amenities and is the perfect location for the ASB Annual Meeting. The Conference Center offers a large, 500-capacity Ball Room for our Plenary Session on Wednesday evening and our Friday night Banquet. Additionally, there are eight rooms with capacities of 150 each and two rooms seating 50-60 each. The Florence Conference Center has a lovely, high ceiling foyer where we will showcase our exhibitors. Spacious hallways allow ample room for poster presentations and a small preview room is located just off the main foyer. The Convention Center has plans to construct a large hotel on site, but unfortunately, no guarantee could be given that the facility would be completed by the time we hold our meeting.

Box lunches to eat at the Conference Center are available for \$7.00 to order with pre-registration. Otherwise, all lunches will generally be off site, but the Florence Conference Center is located within three minutes of "restaurant row" where ASB members can find, burgers, steaks, Mexican, Italian, and awesome barbeque just to mention a few choice items.

## LODGING

**The Holiday Inn, Florence-Muscle Shoals-Sheffield** will serve as the host hotel for the 2005 meeting and is located less than 15 minutes from the Convention Center. Rooms are \$60.00/night for up to 4 persons per room. There are a total of 204 rooms available at the Holiday Inn and they are expecting full booking Thursday and Friday nights so make your reservations early, but please mention that you are a part of the Association of Southeastern Biologists group convention. Although other nearby hotels typically charge higher rates, the Holiday Inn staff will be happy to book you in the nearby hotels for the same low rate should the Holiday Inn run out of rooms. They will contact you with directions and confirmation numbers for the outside booking.

Holiday Inn: 1-800-465-4329 or 1-256-381-4710.

## REGISTRATION

	Pre-Registration (before March 15)	Late Registration (after March 15)
Regular Registration <sup>a</sup>	\$100.00	\$130.00
Student Registration <sup>a,b</sup>	\$ 60.00	\$ 85.00
Exhibitor with no booth <sup>a</sup>	\$130.00	\$150.00

<sup>a</sup>Does **not** include ASB membership dues. Membership application or renewal forms are available at [www.asb.appstate.edu](http://www.asb.appstate.edu).

<sup>b</sup>Faculty sponsor name and e-mail required.

Regular Thursday night <b>ASB Barn Bust Social</b>	\$30.00
Student Thursday night <b>ASB Barn Bust Social</b>	\$20.00
Regular Friday evening <b>ASB Banquet*</b>	\$25.00
(ASB Award winners <u><b>must be present</b></u> to receive award)	
Student Friday evening <b>ASB Banquet*</b>	\$15.00
(ASB Award winners <u><b>must be present</b></u> to receive award)	

All pre-registration will be done online by going to [www.asb.appstate.edu](http://www.asb.appstate.edu) and following the meeting links to registration. Members may pay using MC, VISA, AmEx, or Discover. Additionally, the form may be printed and mailed with a check if desired. Registration includes the Welcome Wine and Cheese Social prior to the Plenary Session and the Post-plenary Social following the talk, each with a cash bar. Red or white wine will be available to purchase at the banquet tables for \$20.00 per bottle.\*\*

\*Food cannot be brought into the Conference Center.

\*\*Sorry, but only whole bottles available.

## Florence Weather

Florence weather in April is unpredictable, so prepare for layers and rain. Temperatures will likely be in the low 70s to low 80s during the day, but may drop into the 50s at night.

## TRANSPORTATION

The Holiday Inn Florence-Muscle Shoals-Sheffield is located on U.S Highway 43 at the Second Street intersection in Sheffield, AL. The Florence Conference Center is located approximately 5 miles from the Holiday Inn just off Alabama Highway 133 in Florence. Shuttle service will be provided from the hotel to the Conference Center. There is also ample parking at the Conference Center for those who wish to drive from the hotel.

*Coming from the west on U.S. 72 from Mississippi/Memphis:* Follow US 72 east to the US 43 intersection and take US 43 north until you reach the Holiday Inn on the left just past Second Street. To reach the Conference Center, turn right onto Second Street and continue about 2 miles to AL 133 north and turn right. Continue across the Tennessee River following AL 133 north until you see signs for the conference center on the right.

*Coming from the east on U.S. 72 from Huntsville:* Follow US 72 west to AL 133 south and turn left. Stay on AL 133 until you see signs for the conference center on the left. Continue on AL 133 south across the Tennessee River until you reach Second Street and turn right. Stay on Second Street until you reach US 43 and turn right. The Holiday Inn will be on the left.

*Coming from the east from the Huntsville airport:* Follow I-565 south to I-65 north. Take I-65 north to US 72 west in Athens, AL. Follow US 72 west to AL 133 south and turn left. Stay on AL 133 until you see signs for the conference center on the left. Continue on AL 133 south across the Tennessee River until you reach

Second Street and turn right. Stay on Second Street until you reach US 43 and turn right. The Holiday Inn will be on the left.

*Coming from the south from Birmingham or Birmingham airport:* From the airport take Airport Boulevard from the airport to I-20 west/I-59 south. Take I-20 west/I-59 south to I-65 north. From airport or further south, take I-65 north to US 72 west in Athens. Follow US 72 west to AL 133 south and turn left. Stay on AL 133 until you see signs for the conference center on the left. Continue on AL 133 south across the Tennessee River until you reach Second Street and turn right. Stay on Second Street until you reach US 43 and turn right. The Holiday Inn will be on the left.

*Coming from Nashville:* Take I-65 south to the US 72 west exit in Athens. Follow US 72 west to AL 133 south and turn left. Stay on AL 133 until you see signs for the conference center on the left. Continue on AL 133 south across the Tennessee River until you reach Second Street and turn right. Stay on Second Street until you reach US 43 and turn right. The Holiday Inn will be on the left.

*Coming from Muscle Shoals airport:* Exit airport and turn right. Continue to Second Street (the end of the road) and turn left onto Second Street. Stay on Second Street until you reach US 43 and turn right. The Holiday Inn will be on the left. To reach the Conference Center, turn right onto Second Street and continue about 2 miles to AL 133 north and turn right. Continue across the Tennessee River following AL 133 north until you see signs for the conference center on the right.

## ASB BARN BUST SOCIAL

The 2005 Thursday night ASB Social, dubbed the **ASB Barn Bust** promises to be outstanding. Needless to say, the name of the party reflects the nature and location of the event, so your best bet will be to include jeans and old shoes in your meeting wardrobe. The site location will remain undisclosed, so please, no driving to the event; we will provide buses to ferry members to and from the social. We plan to have a foot-stomping good time with live entertainment provided by a great local dance band called the **Midnighters** specializing in a great mix of 60's through today's rock and roll dance music. The evening's fare will feature the local specialty of southern fried catfish with all the trimmings of coleslaw, hushpuppies, and french fries along with boiled crawfish and/or shrimp with potatoes and corn all cooked up by a local favorite restaurant called *Cajun's Seafood*. Beverages for the evening will include iced tea and *plenty* of cold beer.

## FRIDAY NIGHT BANQUET

We are in hopes of increasing our banquet attendance at this meeting, especially student attendance (those competing for awards should remember you must be present at the banquet to receive the award). In order to do so, we have arranged for an outstanding offering at an excellent price: \$25.00 for regular members and \$15.00 for students. The evening's event will be at the Florence Conference Center Ball Room and will offer your choice of fillet mignon, chicken breast, or salmon fillet along with vegetables, roll, dessert, water, and iced tea.

Vegetarian meals can be provided upon request. Additionally, wine will be available for purchase at your table to have along with your meal should you so desire. Be sure and attend because you will not want to miss this excellent meal nor the hilarious Past-President's Address by, then, Past President Andrew Ash.

## EXHIBITORS/SPONSORS

If you are interested in exhibiting at the meeting and/or sponsoring meeting events, please contact Scott Jewell at [A2ZConvention@Yahoo.com](mailto:A2ZConvention@Yahoo.com), or visit our website at [www.asb.appstate.edu](http://www.asb.appstate.edu) and follow the exhibitor information link. Space is limited so sign up early.

## FIELD TRIPS

### **Cane Creek Canyon Nature Preserve**

*Time:* 9:00 a.m. - 2:00 p.m.

*Number of Participants:* 20

*Primary Field Trip Leader:* Jim Lacefield, private landowner, biologist, geologist

*Description of Site/Trip:* Cane Creek Canyon Nature Preserve is a 413 acre, privately protected scenic natural area located in the Little Mountains region of Colbert County, Alabama. The rugged terrain provides a wide range of habitats and diverse natural communities. Ravines, waterfalls, bluffs, rock shelters, and giant boulders contribute to the scenic nature of the preserve. The area is noted for its abundance and diversity of spring wildflowers and high tree diversity (over 100 species). A number of rare plant species occur on the preserve including French's shooting star.

### **Sipsey Wilderness, Bankhead National Forest**

*Time:* 9:00 a.m. - 2:00 p.m.

*Number of Participants:* 16

*Primary Field Trip Leaders:* Paul Davison, UNA botanist; Rhonda Stewart (USDA Forest Service botanist from Bankhead National Forest)

*Description of Site/Trip:* The Sipsey Wilderness is noted for its deep ravines that provide microclimates that host disjunct plant populations typical of more northerly areas, including, for example, eastern hemlock, sweet birch, and many other species. The narrowly endemic and endangered flattened musk turtle inhabits local streams and the green salamander is at the southern end of its range. The ravines are noted for their waterfalls, bluffs, and remnant stands of old growth forest.

### **Prairie Grove Glade Nature Preserve**

*Time:* 9:00 a.m. - 2:00 p.m.

*Number of Participants:* 16

*Primary Field Trip Leaders:* David Webb, TVA botanist



*Description of Site/Trip:* The Nature Conservancy has protected the last and largest remnant limestone cedar glade in its 191 acre Prairie Grove Glade Nature Preserve. The preserve was established to protect the cedar glade community with its many narrowly endemic plants. Some of the rare species include *Lesquerella lyrata*, lyrate bladderpod, a federally listed endangered species; *Leavenworthia alabamica*, Alabama glade cress; *Delphinium alabamicum*, Alabama larkspur; and *Eriogonum longifolium* var. *harperi*.

**SPOUSE TOURS**

The Florence/Lauderdale Tourism Office has arranged day trips for spouses attending the 2005 ASB meeting. All spouses are cordially invited to participate in the Renaissance City Spouse Tours. One tour each day will be conducted and spouses or any other interested parties may join either or both tours.

**Day 1 Tour:** Frank Lloyd Wright Rosenbaum House, W.C. Handy Home (the father of jazz), 1800's Pope's Tavern, Helen Keller Birthplace, and lunch at the Alabama Music Hall of Fame with entertainment by local recording artists. Day 1 menu includes L.O. Bishop Barbecue, chips, beans & drink. \$35.00.

**Day 2 Tour:** North Florence Village & Downtown Florence, shopping at antique stores, Old Time Hardware Store, unique ladies & men's apparel boutiques, Kennedy-Douglass Art Center exhibit, gourmet lunch at Eva Marie's Restaurant, and a haunted history walking tour of downtown Florence. Day 2 menu includes choice of 5 different Panini grill sandwiches, chips or salad, drink and dessert. \$27.50.

**TENTATIVE PROGRAM**

Activity	Time	Location
<b>WEDNESDAY, APRIL 13</b>		
Registration	12:00-9:00 PM	Lobby
ASB Executive Committee Meeting	1:00-6:00 PM	Wilson
SABS Council Meeting	3:00-7:00 PM	Wheeler
Exhibitors Set Up	8:00 AM-12:00 PM	Ballroom
ASB Welcome Reception	6:00-7:00 PM	Ballroom
ASB Plenary Session	7:00-8:30 PM	Riverfront A & B
ASB Social	8:30-10:00 PM	Ballroom
<b>THURSDAY, APRIL 14</b>		
Registration	8:00 AM -5:00 PM	Lobby
Continental Breakfast	8:00-9:00 AM	Ballroom
ASB Past President's Breakfast	7:00-8:30 AM	Holiday Inn
Poster set up	7:00-8:00 AM	Ballroom
Authors at posters	8:00-9:00 AM	Ballroom



Coffee Break	10:00-10:30 AM	Ballroom
Posters left up	8:00 AM -5:00 PM	Ballroom
Exhibitors	8:00 AM -5:00 PM	Ballroom
Slide preview room	8:00 AM -5:00 PM	Wilson
PAPER SESSIONS		9:00 AM -12:00 PM
Plant Ecology I		Patton
Herpetology I		O'Neal
Plant Systematics I		Riverfront A & B
Invertebrate Zoology		Sweetwater A
Ichthyology		Sweetwater B
Genetics, Cell & Molecular Biology		Sweetwater C
SWS Luncheon	12:15-1:30 PM	Holiday Inn
Lunch Break	12:00-1:30 PM	
Women, Minorities, and Persons with Disabilities Roundtable Discussion	12:00-1:00 PM	Wheeler
PAPER SESSIONS		1:30-5:00 PM
Plant Ecology II		Patton
Herpetology II		O'Neal
Plant Systematics II		Riverfront A & B
Aquatic Ecology		Sweetwater A
Microbiology I		Sweetwater B
Coffee Break	3:00-3:30 PM	Ballroom
Southeastern Fisheries Council Meeting	5:00-5:30 PM	Wheeler
ASB Social	7:00-12:00 PM	TBA

FRIDAY, APRIL 15

Registration	8:00 AM -12:00 PM	Lobby
Continental Breakfast	8:00-9:00 AM	Ballroom
Slide preview room	8:00 AM -5:00 PM	Wilson
Authors at posters	8:00-9:00 AM	Ballroom
Posters left up	8:00 AM-12:00 PM	Ballroom
Exhibitors	8:00 AM-12:00 PM	Ballroom
SABS/BSA Brk	7:00-8:30 AM	Holiday Inn
BBB poster set up	7:00-8:00 AM	Ballroom
BBB Judges and Officers	8:30-11:30 AM	Wheeler
BBB Business	8:30-11:30 AM	Riverfront A & B
PAPER SESSIONS		9:00-11:30 AM
Plant Ecology III		Patton
Herpetology III		O'Neal

Microbiology II/ Parasitology  
Plant Biology

Sweetwater B  
Sweetwater C

Education Symposium

8:45-11:30 AM

Sweetwater A

Coffee Break

10:00-10:30 AM

Ballroom

ASB Bus Meeting

11:30 AM-12 PM

Riverfront A & B

ESA Luncheon

12:15-1:30 PM

Holiday Inn

Exhibitor clean up

12:00 PM-3:00 PM

Ballroom

Poster take down

12:00 PM-3:00 PM

Ballroom

Slide Preview

Afternoon

Wilson

Soc. of Herbarium Curators

Executive Board Meeting

1:00-2:00 PM

Riverfront A & B

Soc. of Herbarium Curators Meeting

2:00-3:00 PM

Riverfront A & B

Herbarium Symposium

3:00-5:00 PM

Riverfront A & B

#### PAPER SESSIONS

1:30-5:00 PM

Animal Ecology

Patton

Teaching Biology

Sweetwater C

BBB Session I

Sweetwater A

BBB Session II

Sweetwater B

BBB Session III

O'Neal

Coffee Break

3:00-3:30 PM

Ballroom

Cocktail Hr

6:00-7:00 PM

Lobby

ASB Banquet

7:00-10:00 PM

Ballroom

#### SATURDAY, APRIL 16

ASB Executive Committee Meeting

8:00 AM-12:00 PM

Holiday Inn

Field Trips:

Cane Creek Canyon Nature Preserve

9:00 AM-2:00 PM

Sipsey Wilderness, Bankhead Nat'l

Forest

9:00 AM-2:00 PM

Prairie Grove Glade Nature Preserve

9:00 AM-2:00 PM



**LOCAL COMMITTEE ASSIGNMENTS  
FOR THE ASB 66<sup>th</sup> ANNUAL MEETING  
UNIVERSITY OF NORTH ALABAMA  
FLORENCE, AL**

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<i>Volunteers Coordinator:</i>	Donald Roush	
<i>Transportation/Parking/ Tourism:</i>	Terry D. Richardson	

## **AFFILIATE SOCIETIES MEETING WITH ASB IN APRIL 2005**

### **HOST: THE UNIVERSITY OF NORTH ALABAMA**

The following affiliate societies, **except the SE Division of ASIH**, will be in attendance at the 2005 Annual Meeting. We anticipate an excellent diversity of paper and poster presentations. The societies and their contacts are listed below.

**American Society of Ichthyologists and Herpetologists**  
**Southeastern Division**

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**Southeastern Chapter**

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**Society of Wetland Scientists**  
**South Atlantic Chapter**

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## ***SPECIAL REMINDERS FROM THE PRINT EDITOR***

### ***ASB BANQUET ATTENDANCE***

Please keep in mind that recipients of ASB awards must be present at the annual ASB banquet to receive the award. Therefore, all applicants for ASB awards must attend the banquet to insure the presence of the winners.

### ***EXTRA ABSTRACT SUBMISSION***

Besides sending abstracts of papers and posters to the Program Committee by November 12, 2004, anyone wishing to be considered for an award must send an abstract to the respective award committee chairperson in order to be considered. Checking the box on the registration form for the award is not enough. An abstract must be sent to the chairperson by January 7, 2005.

### ***INSTRUCTIONS FOR SUBMITTING ORAL PRESENTATIONS***

All oral presentations will be done using Microsoft PowerPoint or MS PowerPoint-compatible software only. Presenters must bring backups consisting of one or two copies of disks (CDs) to the meeting. Moreover, 2x2 slide projectors will not be available. Anyone wishing to present using 2x2 slides must bring their own projector. Overhead projectors will be available for anyone bringing backup overheads.

### ***FINAL SUBMISSION OF CD***

Complete and final presentations must be submitted on CD by April 1. The first author's name and truncated title must be written on the upper surface of the CD using an indelible marker.

Submit the CD by the April 1<sup>st</sup> deadline to: ATTN: ASB 2005 Annual Meeting, c/o Dr. Terry D. Richardson, University of North Alabama, Box 5212, Florence, AL 35632-0001.

## Plenary Speaker – Massimo Pigliucci



Dr. Pigliucci is Professor in the Department of Ecology & Evolution at SUNY-Stony Brook (Long Island, NY). His research is on the evolution of genotype-environment interactions and on the role of constraints in evolutionary biology. He also has an interest in epistemology and philosophy of science.

He received his Doctorate in Genetics at the University of Ferrara in Italy, his Ph.D. in Botany from the University of Connecticut, and a Ph.D. in Philosophy of Science at the University of Tennessee. He has published 65 technical papers and three books on evolutionary biology: *Phenotypic Evolution: a Reaction Norm Perspective* (with Carl Schlichting, Sinauer, 1998); *Phenotypic Plasticity: Beyond Nature and Nurture* (Johns Hopkins University Press, 2001); and *Phenotypic Integration: the Evolution of Complex Phenotypes* (co-edited with Katherine Preston for Oxford University Press, 2004). He has also published two books for the general public: *Tales of the Rational: Skeptical Essays about Nature and Science* (Freethought Press, 2000), and *Denying Evolution: Creationism, Scientism, and the Nature of Science* (Sinauer, 2002). His forthcoming book (with philosopher Jonathan Kaplan) is *Making Sense of Evolution: Toward a Coherent Picture of Evolutionary Theory* (Chicago Press).

Dr. Pigliucci has won the Dobzhansky Prize from the Society for the Study of Evolution, of which he is now Executive Vice President. In 2004 he has been elected fellow of the American Association for the Advancement of Science “for fundamental studies of genotype by environmental interactions and for public defense of evolutionary biology from pseudoscientific attack.” He has been an Associate Editor of the *Journal of Evolutionary Biology*. He can be reached via email at [pigliucci@genotypebyenvironment.org](mailto:pigliucci@genotypebyenvironment.org), or on the web at [www.genotypebyenvironment.org](http://www.genotypebyenvironment.org).

**Selected recent publications:**

- Kaplan, J, and Pigliucci, M (2004). On the concept of biological race and its applicability to humans. *Philosophy of Science* **70**: 1161-1172.
- Pigliucci, M, and Schmitt, J (2004). Phenotypic plasticity in response to foliar and neutral shade in gibberellin mutants of *Arabidopsis thaliana*. *Evolutionary Ecology Research* **6**: 243-259.
- Pigliucci, M (2003). Selection in a model system: ecological genetics of flowering time in *Arabidopsis thaliana*. *Ecology* **84**: 1700-1712.
- Pigliucci, M (2003). Species as family resemblance concepts: the (dis-)solution of the species problem? *BioEssays* **25**: 596-602.
- Pigliucci, M, and Murren, C (2003). Genetic assimilation and a possible evolutionary paradox: can macroevolution sometimes be so fast as to pass us by? *Evolution* **57**: 1455-1464.
- Pigliucci, M, Pollard, H, and Cruzan, M (2003). Comparative studies of evolutionary responses to light environments in *Arabidopsis*. *American Naturalist* **161**: 68-82.



Beautiful Wilson Park in downtown Florence.



## ASB EDUCATION COMMITTEE SYMPOSIUM

### *Teaching Evolution and the Challenge of Intelligent Design*

At the annual meeting Friday morning, April 15, 2005, the A.S.B. Education Committee will present a symposium on "Teaching Evolution and the Challenge of Intelligent Design," arranged and moderated by John V. Aliff, Editor of the Georgia Journal of Science. The symposium will address Intelligent Design as a political movement, the scientific and philosophical problems with I.D. ideology, the Kansas State Board of Education science teaching standards controversy, and the teaching of science as scientism—an approach that rejects metaphysical, philosophical, and religious explanations because they cannot be confirmed by science.

#### Participants



Barbara Carroll Forrest earned a B.A. in English at Southeastern Louisiana University, an M.A. from L.S.U., and a Ph.D. in philosophy from Tulane U. Dr. Forrest is professor of philosophy at Southeastern Louisiana U. Her recent scholarly publications include: *The Possibility of Meaning in Human Evolution*, *Zygon: Journal of Religion and Science*, December 2000; and *Creationism's Trojan Horse: The Wedge of Intelligent Design*, with Paul R. Gross, Oxford University Press, 2004. Dr. Forrest is especially interested in intelligent design as a religious and a political movement.

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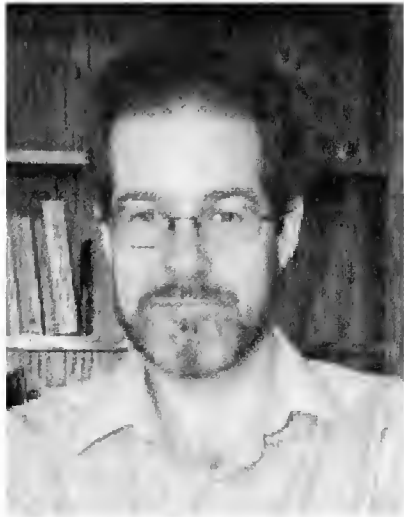
Taner Edis, assistant professor of physics at Truman State U., MO., and guest researcher at Lawrence Livermore National Lab., completed his undergraduate work at Bogaziçi U. in Turkey where he was born, and received his Ph.D. in physics from Johns Hopkins U. His research interests include atmospheric modeling and the philosophy of machine intelligence. His first book, *The Ghost in the Universe: God in Light of Modern Science*, an accessible defense of a naturalistic view of the world, Prometheus Books, for which he received the Morris D. Forkosch Award in 2002. Recently, with Matt Young, he co-edited *Why Intelligent Design Fails: A Scientific Critique of the*

*New Creationism*, Rutgers University Press, 2004.

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Massimo Pigliucci is an Italian citizen, who has a Master's degree in Biological Sciences from the U. of Rome, a doctorate in genetics from the U. of Ferrara, and a Ph.D. in botany from the U. of Connecticut. He was formerly associate professor of Ecology and Evolution at the U. of Tennessee. He is now at S.U.N.Y., Stony Brook. Dr. Pigliucci's book, *Denying Evolution: Creationism, Scientism and the Nature of Science*, Sinauer, 2002, examines the evolution-creation movement by dividing the blame for the controversy equally among anti-intellectual creationists and scientists teaching scientism.

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Keith Miller is a research assistant professor of geology at Kansas State University. He was educated at Franklin & Marshall College (B.S.), S.U.N.Y., Binghamton (M.S.) and the U. of Rochester (Ph.D. in geology). He is editor of the book, *Perspectives on an Evolving Creation*, Eerdmans Publishing Co., 2003, that sets forth moderate positions on the subject of science and religion. His research interests include paleoecology and the geological record of global climate and environmental change. Dr. Miller has been a leader in the scientific response to the

controversy over proposed standards for teaching science education in Kansas that removed the theory of evolution and references to a scientifically determined age of the Earth.

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## Symposium Schedule and Abstracts

8:45 AM

Introduction. John V. Aliff, Chair of the ASB Education Committee

Questions will be reserved for the panel discussion at 11:15 AM.

9:00 AM

PIGLIUCCI, MASSIMO. SUNY-Stony Brook--Is evolution a logical fallacy?

The neo-Darwinian theory of evolution is the currently accepted paradigm to explain the history and diversity of life on earth. Yet, ever since the publication of

Darwin's *Origin of Species* it has been under attack on a variety of grounds. Some of these criticisms have been put forth in the philosophical arena, where evolutionary theory has often been accused of being incoherent or logically fallacious. I will examine some of the most common accusations of logical inconsistency in the theory, showing why they are unjustified, and in the process attempting to explain more clearly what evolution is all about.

9:30 AM

FORREST, BARBARA. Southeastern Louisiana University—Inside Creationism's Trojan Horse: A Closer Look at Intelligent Design.

Intelligent design creationists at the Discovery Institute's Center for Science and Culture present themselves as scientists and scholars concerned with good science and science education. Promoting "intelligent design theory" as a "full-scale scientific revolution," they claim to be on the cutting edge of new scientific research. Contrary to these claims, however, intelligent design is merely the newest evolutionary variant of traditional American creationism. "ID" creationists have made no original contributions to science to support their contention that the purposeful activity of a supernatural designer explains biological phenomena better than natural processes. This is not their true aim. Rather, the movement's leaders are motivated by a desire to translate personal religious preferences into public policy, and they are making steady progress toward this goal. Fewer than a dozen states currently remain exempt from their attempts to influence either science standards, curricula, or textbooks. When approaching school boards and state boards of education, they disguise their creationist agenda with seemingly innocuous terminology that they coopt from legitimate scientific and educational discourse. Lucratively funded by sympathetic benefactors, ID creationists work through a well established network of local, state, and national religious organizations and religious/political operatives. Their political connections include members of Congress and close presidential advisors. The changes they hope to bring about in American public policy reflect their religious exclusionism and anti-secularism. If they succeed in advancing their vision of American culture and politics, serious damage will be done both to science education and to church and state separation.

10:00 AM

Break

10:15 AM

EDIS, TANER. Truman State University—Chance and necessity—and intelligent design?

The "intelligent design" (ID) movement's core concern is not biology—it is establishing intelligence as a separate principle alongside chance and necessity. Functional complexity is, ID proponents think, the signature of intelligence, and intelligence cannot be a product of mere physical processes. They attack Darwinian evolution because it is the best developed and most critical element in

naturalistic explanations of creative novelty. Scientifically, ID fails, not only because evolutionary biology remains a robustly productive and progressive enterprise, but also because Darwinian evolution has taken root outside of biology. Wherever physicists, cognitive scientists, and computer scientists seek to explain creativity and complexity within the natural world, Darwinian ideas appear. Recent research gives us strong reasons to think intelligent design is reducible to chance and necessity, and that broadly Darwinian processes are vital to creativity in general. ID, therefore, is a complete scientific non-starter.

10:45 AM

MILLER, KEITH B. Kansas State University—Countering public misperceptions of evolutionary science.

Challenges to modern evolutionary science are often rooted in fundamental misperceptions of the nature of science itself. Among the public, there is a widespread perception that the focus of science on natural cause-and-effect explanations is a thinly disguised effort to promote a godless worldview, rather than an inherent methodological limitation. Furthermore, theories are commonly viewed as merely unsubstantiated guesses, rather than as the unifying concepts that give our observations coherence and meaning. Theories within the historical sciences, in particular, are seen as being inherently untestable. Science for many is simply an encyclopedic accumulation of unchanging observational “fact.” The dynamic nature of science with the continual revision of theoretical constructs becomes evidence of the fleeting validity of scientific “truth.” Much of the critique of evolutionary theory is also predicated on completely false views of its theoretical content and observational foundation. For example, the common charge that the fossil record lacks the required transitional or intermediate forms is based on erroneous views of the nature of the fossil record, the manner in which species are classified, and the expectations of evolutionary theory. There is little public understanding of the diverse range of observational data from the fossil record, biogeography, comparative anatomy, developmental biology, genetics, and molecular biology that makes sense only in the context of common descent. Too often the grand patterns of nature become obscured in public debate. The future of scientific literacy will depend on how we respond to these misperceptions as scientists and educators.

11:15 AM

Panel Discussion

Questions are invited from the audience after brief interchanges among the participants.

**COMMITTEE ON WOMEN, MINORITIES AND PERSONS WITH DISABILITIES****Increasing Minority Participation in ASB  
A Roundtable Discussion**

The Committee on Women, Minorities and Persons with Disabilities is sponsoring a lunchtime roundtable discussion on increasing minority participation in ASB. The session will be at noon on Thursday in the Wheeler Room and box lunches will be provided for participants. The Committee and some ASB members from minority institutions presently involved in ASB will act as a panel to get the discussion going. The goal is to come up with a list of possible actions ASB could initiate to bring more minority institutions into the membership. Please register on the meeting registration form—we have lunches for up to forty participants.

**NEW ASB AFFILIATE****The Society of Herbarium Curators**

For the past decade, the Herbarium Curator's Committee, a group of herbarium curators in southeastern United States has been informally meeting with the Association of Southeastern Biologists. The group organized a symposium entitled "The Future of Plant Collections in the Southeast" in 2001 and the concept for the expansion of this organization was developed in the ensuing workshop. Through the spearheading efforts of John Herr at the University of South Carolina, Michael Woods at Troy University, and Dan Evans at Marshall University, the group developed a constitution and formally organized as The Society of Herbarium Curators (TSHC) on July 4, 2004. TSHC has been recognized as an affiliate society by ASB and SABS. The group is currently developing a network of collections and botanical expertise in the region, and they plan to use the network to obtain funding to completely database the herbaria of the Southeast by the year 2015. TSHC will use the network and shared data and expertise to provide botanical training to the region. In particular, they will use their network to reach out to groups that have been historically underrepresented in the botanical and conservation communities, to land managers and state and federal agencies, and to the K-12 students and teachers. TSHC will work to support herbaria of all types in the region, to help develop community standards of curation, and to make certain that herbaria are fully utilized and not orphaned by their institution. The Southeast is known as a botanically diverse region and the rate of species description indicates that the region is still providing botanical surprises. The Society of Herbarium Curators is committed to making this rich natural history available to the global scientific community and will work to broaden our scientific knowledge of this amazing region of the earth.



## **SD-ASIH ANNOUNCEMENT RETRACTION**

The Southeast Division of ASIH (SD-ASIH) is meeting with its parent society (ASIH) at the joint Herpetology-Ichthyology meetings in Tampa this summer, rather than at the 2005 ASB meetings in Florence AL. Therefore, contrary to what was printed in Southeastern Biology (page 327, Vol. 512, Number 3), there will be no SD-ASIH student travel or student paper awards presented at the ASB meetings during 2005.



## **QUILLCON II SYMPOSIUM FOR 2005**

**Symposium has been cancelled.**

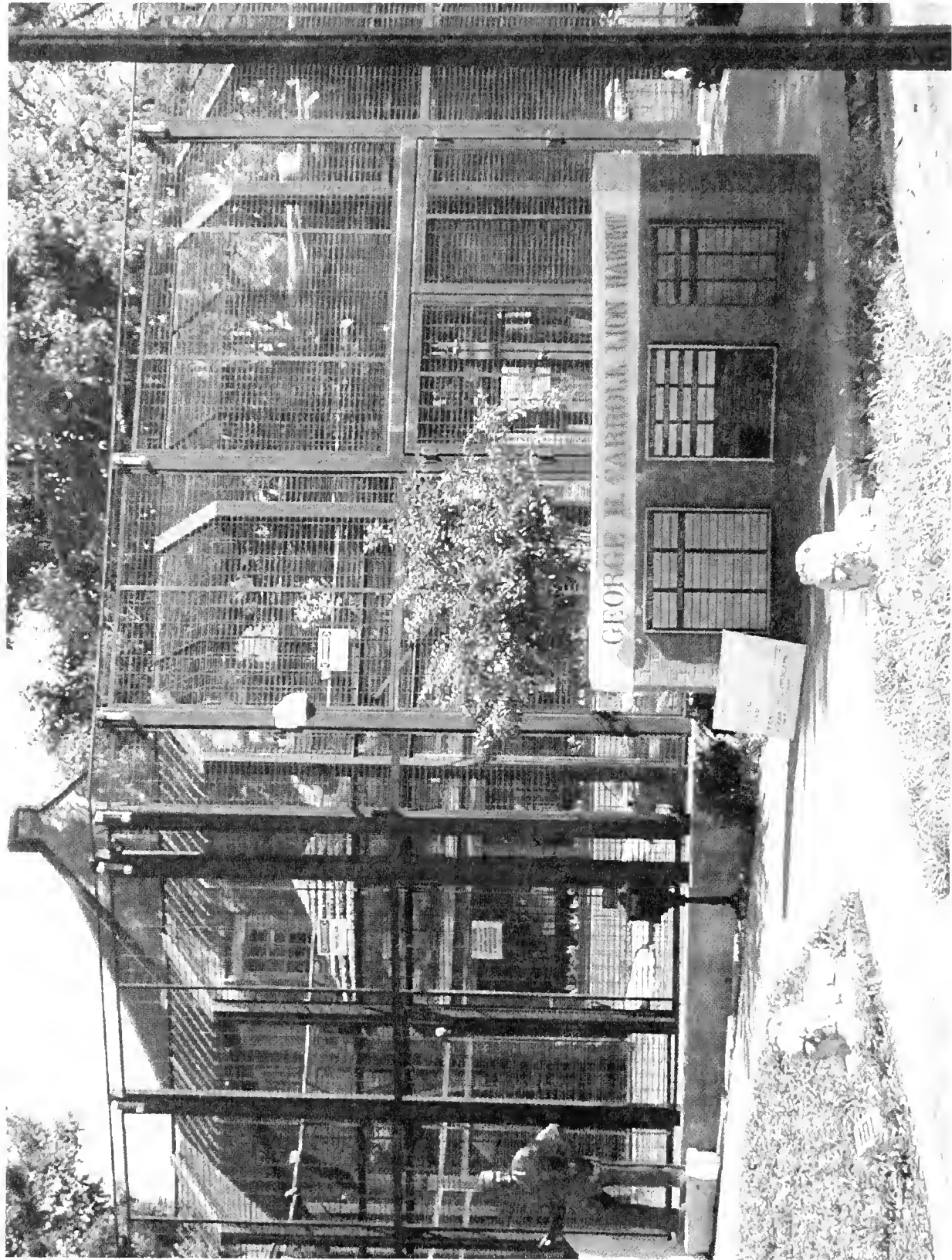


Frank Lloyd Wright Museum in Florence.



Ivy Green—Birthplace of Helen Keller in Tuscumbia, AL.





George H. Carroll Lion Habitat, University of North Alabama.



The *Southeastern Naturalist* . . .

- ◆ A quarterly peer-reviewed and edited interdisciplinary scientific journal with a regional focus on the southeastern United States (ISSN #1528-7092).
- ◆ Featuring research articles, notes, and research summaries on terrestrial, freshwater, and marine organisms, and their habitats.
- ◆ Focusing on field ecology, biology, behavior, biogeography, taxonomy, evolution, anatomy, physiology, geology, and related fields. Manuscripts on genetics, molecular biology, archaeology, anthropology, etc., are welcome, especially if they provide natural history insights that are of interest to field scientists. Symposium proceedings are occasionally published.
- ◆ Indexed in Biological Abstracts (BIOSIS), BIOSIS Previews, CAB Abstracts, Cambridge Scientific Abstracts, EBSCO-host, Environmental Knowledge-base (formerly Environmental Periodicals Bibliography), FISHLIT (Fish and Fisheries Worldwide; Aquatic Biology, Aquaculture, and Fisheries Resources), Wildlife Review Abstracts, and Zoological Record (BIOSIS UK). Arrangements for indexing in Elsevier BIOBASE (Current Awareness in Biological Sciences), and ISI Services (Science Citation Index-Expanded, ISI Alerting Service, and Current Contents/Agriculture, Biology, and Environmental Sciences) are pending.
- ◆ A sister journal of the *Northeastern Naturalist* (ISSN #1092-6194), published since 1997. Both journals are identical in focus, format, quality, and features. The journals together serve as a matched-pair of regional journals that provide an integrated publishing and research resource for the eastern part of North America.
- ◆ Printed by Allen Press, printer of many journals in the biological and environmental sciences, especially those whose parent organization is a member of the American Institute of Biological Sciences (AIBS).
- ◆ Available online in full-text version in the BioOne database ([www.bioone.org](http://www.bioone.org), a collaborative effort of Allen Press, AIBS, and other organizations) and the Proquest Information and Learning databases ([www.il.proquest.com](http://www.il.proquest.com)).
- ◆ For information, instructions for authors, and subscriptions: Southeastern Naturalist, PO Box 9, 59 Eagle Hill Road, Steuben, ME 04680-0009; 207-546-2821, FAX: 207-546-3042; <mailto:office@eaglehill.us>; <http://www.eaglehill.us/jsgeninf.html>. Online secure ordering of subscriptions is available!

# Southeastern Naturalist

Volume 3

2004

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# Southeastern Naturalist

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## Classified Ads for Northeastern and Southeastern Naturalist

Classified ads offering opportunities for people with career interests in the natural history sciences may now be placed in the *Southeastern* and/or *Northeastern Naturalists*, within the following categories.

- Faculty positions at colleges and universities
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Ads need to be received by February 20, May 20, August 20, and November 20, and must be placed over the web at <http://eaglehill.us/Merchant2/merchant.mv>. Journal issues mail about one month later. Rates are a modest \$.03/character, with a \$5 minimum. Space allocated to classified ads within the journal is limited. Ads will be reviewed prior to acceptance.



The President's Home, University of North Alabama.

## ALL TAXA BIODIVERSITY INVENTORY (ATBI) GATLINBURG, TENNESSEE

More information about the ATBI and Discover Life in America (DLIA) may be obtained from the Administrative Officer, Jeanie Hilten, by e-mail at [jeanie@discoverlife.org](mailto:jeanie@discoverlife.org). The website is <http://www.discoverlifeinamerica.org> or <http://www.dlia.org>. The mailing address is 1314 Cherokee Orchard Road, Gatlinburg, TN 37738. The telephone number is (865) 430-4752.



*The following two articles were reprinted with permission from the Vol. 5, No. 1, Winter 2004, issue of the "ATBI Quarterly," Ruthanne Mitchell, Editor.*



### ***Trechus* Beetles in the Smokies: Islands in the Sky**

Thomas C. Barr  
1520 Chickering Road  
Nashville, TN 37215-4904

When groups of small, wingless animals are confined to high elevations in the Smokies and other high mountains of the Unaka chain, exchange of genes becomes limited or shut off, leading to isolated populations on different mountain peaks. If you take a topographic map and draw red lines along the 4000-ft. contour, you will have a number of isolated enclosures resembling islands and archipelagoes. Such are the discontinuous habitats of altitudinally restricted species. One of the more intensely varied groups of these isolated animals in the southern Appalachians is the ground beetle genus *Trechus* (family Carabidae). At least 14 species occur within Great Smoky Mountains National Park (GSMNP), and there are now about 60 taxa (species and subspecies, many still undescribed) of these little predators known from the southern Appalachians. In contrast to this burst of diversity in the Unaka mountains, another dozen species of *Trechus* are found elsewhere in the United States and Canada, and about a half dozen more are limited to the high mountains of central Mexico.

*Trechus* beetles are small, shiny black, rather robust, and convex with conspicuously round-oval elytra; they range in total length from about 2.5 to 5.5 mm. To collect them, forest floor litter is scooped up and rocked back and forth in a sifter until small arthropods fall through the holes and into a tray. A plastic sifter is light and easily carried for use in the field, where processed litter is discarded.

During the past two years, Chris Carlton, from Louisiana State University, has collected hundreds of *Trechus* from GSMNP, and Igor Sokolov, of the Russian Institute for Plant Protection in St. Petersburg, has identified them. In addition to five previously identified species, a sixth species has been found that is new to science and will be named to honor the late Don DeFoe, long time Museum Curator and naturalist for GSMNP.

South and west of the Asheville basin, almost all *Trechus* species belong to the endemic subgenus *Microtrechus*, which includes all 14 species in the Smokies. The subgenus *Trechus* is Holarctic in distribution and a majority of

species found east and north of the Asheville basin belong to this subgenus. As more and more Unaka species became known, it was apparent that the bigger mountain ranges had more endemic *Trechus* species than smaller ones. The Smokies, being the largest range, has 14 species, while the smaller adjacent Plott Balsams and Nantahalas have only five species each, the Great Balsams and Pisgah Ledge have six, and so on. The most likely interpretation is that greater area of suitable habitat provides more opportunities for niche divergence and species packing among closely related taxa. Movement of ancestral species between ranges presumably occurred during glacial maxima in Pleistocene time, when gaps between ranges at 3500 ft. or less were much colder than today. The "sky islands" become much larger, and some of them join together. The effect on distribution can be simulated by now drawing our red lines along, say, the 3500-ft. contour.

What, exactly, are the differences between *Trechus* species that coexist in the Smokies or other high ranges? Eight of the 14 known species in the Smokies inhabit the central uplands around and between summits of Clingmans Dome, Mt. LeConte, and Mt. Kephart, while the remaining six are found only in the eastern or western ends of the Park or in caves and sinkholes in Tuckaleechee Cove. *Trechus* species are basically denizens of the forest floor duff, and the larger the species, the deeper they occur down in the mixture of conifer needles and silt. The smallest species—those of the vandykei group, such as *T. bowlingi* (a Smokies endemic)—inhabit the superficial layers; the largest species, such as *T. novaculosus* (Smokies) or *T. rosenbergi* (Plott Balsams), are found several inches down into the conifer needle duff or among loosely stacked rocks in springs; species of intermediate size most often are found at the middle depths. The food available in these microhabitats are primarily small invertebrates, but which items from this banquet the *Trechus* actually capture and eat is a rich area for investigation.

As with all other holometabolous insects, what happens during the larval stage is a critical component of a trechine's niche. Larvae are rather scarce and seasonal, but they can be sought in the duff layers where the adult beetles occur.



An undescribed species of *Trechus* from the Smokies crest east of Newfound Gap superficially resembles most of the 13 other species found in the Park.

Chris Carlton

They apparently peak in the Smokies and adjacent mountains sometime in late July. Do these beetles hibernate? Probably. I've collected *Trechus* in March in the Great Balsams near the Devils Courthouse, when the moss carpets were encrusted with ice and the beetles' tarsi were frozen to the rocks. Likewise, Chris Carlton and Adriean Mayor sifted litter beneath a 4-inch snowfall during December 2003 at Rainbow Falls and recovered good numbers of *Trechus* from the thawed but soggy sample.

With the taxonomy of *Trechus* in the Smokies and other Unaka mountain ranges approaching the stage where almost all the species have been

discovered and described, the way is open for research into niche components of coexisting species.

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- Kane, T. C., T. C. Barr, and G. E. Stratton. 1990. Genetic patterns and population structure in Appalachian *Trechus* of the vandykei group (Coleoptera: Carabidae). Brimleyana, no. 16, pp 133-10.

*Thomas C. Barr*, tcbarr@comcast.net. Tom Barr is professor emeritus of Biological Sciences at the University of Kentucky, Lexington; he currently lives in Nashville. He first began studying the *Trechus* of the southern Appalachians in 1958.



*The following article is reprinted with revisions from the original by the author.*

## Notes on the Lichen Flora of the Great Smoky Mountains National Park

Tor Tønsberg  
Museum of Botany  
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Before I started hunting for lichens in the Great Smoky Mountains National Park (GSMNP) in the southern Appalachians (in North Carolina and Tennessee), I had field experience in North America mainly from the Pacific northwest. In addition, I had paid short visits to, e.g., Nova Scotia and Newfoundland. In 2002 and 2003 I was authorized by Discover Life In America, Inc./All Taxa Biodiversity Inventory (ATBI) to carry out lichenological field work in the GSMNP. The aim of my ATBI project was to add as many species as possible to the park lichen checklist with emphasis on sterile (i.e., without fruiting bodies), corticolous (growing on tree trunks or branches), crustose lichens. Based on the field work carried out in 2002 a brief report was published (Tønsberg 2004). According to their growth form, lichens are either foliose (leaf-like with an upper side and a lower side separable from the substratum), fruticose (more or less shrublike), or crustose (crust-like and not separable from the substratum). Many of the crustose species are so small that a hand-lens is necessary to recognize them in the field, whereas other species may be conspicuous and also cover extensive patches on tree trunks. For the study of sterile crustose lichens a good hand lens is needed in the field since many of the species are too small to be readily observed. In the laboratory a good dissecting microscope is necessary. For lichens the chemical constituents (the so-called lichen substances) are important taxonomic characters. For sterile lichens the chemistry is especially important. A thin-layer chromatography (TLC) laboratory is indispensable.



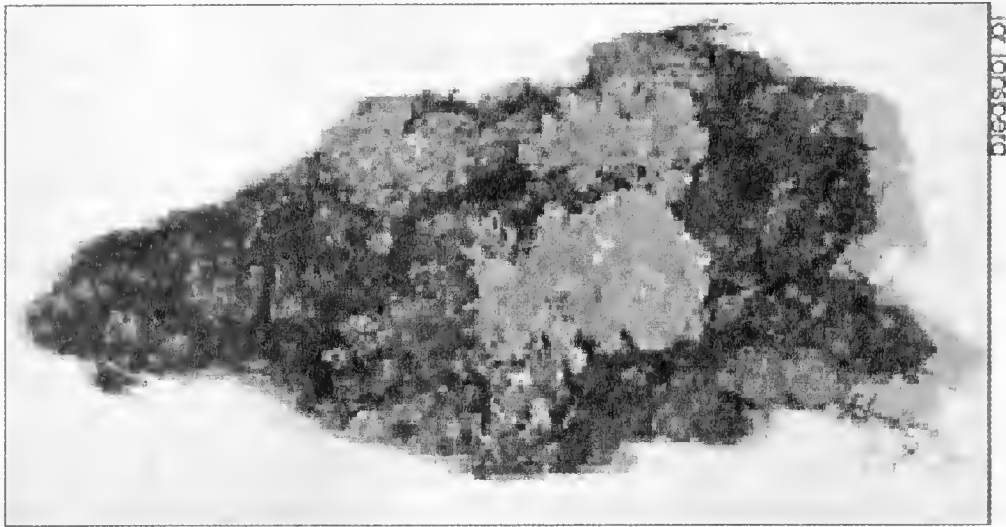
With field experience mainly from much more northerly regions, I felt partly rather lost, and partly at home when first visiting the GSMNP. At lower elevations the forest is dominated by an overwhelming diversity of deciduous trees and shrubs supporting a very rich lichen flora with many genera new to me. At the highest elevations, e.g., along the Appalachian Trail, I could more easily identify most of the lichen genera, and even many of the species were well-known.

Several of the lichens I collected proved to represent species new to science. Some of these were among the most commonly found species on tree trunks in the park. So far four such species have been described: *Biatora appalachensis* Printzen & Tønsberg (Printzen & Tønsberg 2004) with the type specimen collected along the Appalachian Trail), *B. printzenii* Tønsberg (Tønsberg 2002) with the type specimen collected along Kephart Prong Trail), *B. pontica* Printzen & Tønsberg (Printzen & Tønsberg 2003) with the type from Turkey, and *Vainionora americana* Kalb, Tønsberg & Elix (Kalb 2004) with the type from North Carolina, Transylvania Co. All these species, especially the *Biatora* species, can easily be observed along trails. They form greyish to straw-colored patches (*Vainionora*) or greenish, more or less dusty covers (*Biatora*) to several cm or more in diameter on a variety of trees, such as *Acer* spp., yellow birch (*Betula alleghaniensis*), black birch (*B. lenta*), ironwood (*Carpinus caroliniana*), American beech (*Fagus grandifolia*), mountain holly (*Ilex montana*), tulip tree (*Liriodendron tulipifera*), and American mountain-ash (*Sorbus americana*). To find them is one thing. To distinguish between them may be difficult unless you know exactly what to look for. Even specialists may often have to bring the specimens to the lab and use chemical methods before she/he can be able to identify them. The GSMNP still has a lot of undescribed species of lichens; more new species will be described in the future.

In addition to species new to science a number of species was found new to the park, i.e., species that had not been published from the park before. Some of these species represented major range extensions. New to Eastern North America were *Gyalideopsis anastomosans* which is widespread in the park on wood and bark, and *G. piceicola* and *Microlychnus epicorticis* which are species on thin twigs of fraser fir (*Abies fraseri*) and red spruce (*Picea rubens*) at higher elevations, e.g., along the Appalachian Trail. In North America these species are common in the Pacific northwest. Apparently not published from the park before were also *Lecidea roseotincta* and *Mycoblastus caesius* which also occur at the highest elevations. These species are known to the author from the coastal lowlands of the Pacific northwest and from Newfoundland. Apparently, at low northern latitudes such as in the Park (about 35-36°), these species can thrive only at high elevations.

As mentioned above, my research in the park focuses on sterile, crustose lichens. These lichens are adapted to dispersal by vegetative diaspores. When apothecia are present, a lichen is said to be fertile; however, some species, such as those in the genus *Lepraria* (dust lichens), are always sterile (i.e., apothecia are not known). Fortunately, the *Lepraria* species can usually be recognized by morphology and chemistry. This genus is particularly diverse in the park and there are several undescribed species. In the park are also distinct species that can't yet be assigned to a genus. Like the species of *Lepraria* they have never been found with sexual structures. To be able to classify such species, one has to search for and find fertile specimens in the field, and/or use molecular methods.





A species of *Leioderma*, which is new to science,  
found growing on a tulip poplar.

The GSMNP has a remarkably rich and interesting lichen flora. It certainly is a privilege to have the possibility to study them.

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### The Benefits of Fire: Burning for Biodiversity

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As is often the case with enduring truths, they first are ridiculed, then violently opposed, and finally pronounced as self-evident. So it is with the benefits of fire. We first disapproved of folks burning the forest, then we suppressed all fires

(violently opposed). We now are in the process of moving into the third stage where the benefits of fire are self-evident.

John Shea, a U. S. Forest Service psychologist, interviewed southern Appalachian residents in 1939 regarding the use of fire. These people had been using fire for generations, and their feeling was that burning was the right thing to do. While their explanations may not have convinced any land manager of the benefits of fire, southerners did have ecological and economic reasons for burning. They observed that fire reduced pest insect and snake populations, maintained an open understory for hunting, and enhanced forage for game. Forest managers of the time, however, had little appreciation for burning or the ecological importance of fire and even ridiculed burning. Shea described the southerners need to burn as a “recreational and emotional impulse.” He concluded that “the light and sound and odor of burning woods provide excitement for a people who dwell in an environment of low stimulation and who naturally crave excitement...Their explanation that wood fires kill off snakes, boll weevil, and serve other economic ends are something more than mere ignorance. They are the defensive beliefs of a disadvantaged culture group.” Ignoring the advice of folks who lived on the land and of Native Americans who had burned it long before the arrival of Europeans, our government set about suppressing all fires on federal lands.

We are still struggling to change our beliefs and to get beyond the view that burned forest areas are ugly. What first appears to be destructive is in fact the process of renewal. We also are beginning to understand the role disturbance plays in maintaining biodiversity. Of course, too much fire appears to be as destructive as no fire at all.



The first prescribed fires on the west side of the Park in the Tabcat area.

NPS Fire Effects Monitor



NPS Fire Effects Monitors

Another view of the prescribed burn in the Tabcat area.

We do not yet know or comprehend all the ramifications of fire suppression, but we have several working hypotheses. Without fires, fire-dependent species are lost and fire-dependent communities change, often resulting in the loss of biodiversity. For example, botanist Alfred Schuyler had been searching for Long's bulrush (*Scirpus longii*), a New Jersey pine barrens species that hadn't been seen in 25 years, when suddenly he came across an area where it was very prevalent. It turns out that an extremely hot fire in this area in 1983 resulted in a resurgence of this fire-dependent species.

The National Park Service and other land management agencies have begun to understand that fire plays an essential role in the maintenance of many communities. In the southeastern United States, communities of particular concern are table mountain pine (*Pinus pungens*), yellow pine (*P. echinata*, *P. rigida*, *P. virginiana*) and xeric oak (*Quercus* spp.). In Great Smoky Mountains National Park, these communities are being invaded by fire-intolerant hardwoods like red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*), and white pine (*P. strobus*). As a result of increased shading and leaf litter build up, pine seedlings are not able to germinate or grow. As the overstory community changes, the herbaceous community, which is adapted to open dry habitat, also declines.

In the late 1990's, Great Smoky Mountains National Park's Fire Management program was established to reintroduce fire into these fire-dependent communities. In the western portion of the Park there are two objectives: first, reduce fireintolerant species and promote pine seedling regeneration, and second, create habitat for the red cockaded woodpecker (*Picoides borealis*), a federally listed species that was last seen in the Park in the late 1970's. After two prescribed burns, the understory has opened up, the density of pine seedlings has increased, and the abundance of grasses and forbs NPS Fire Effects Monitors Fire column on Cataloochee burn site. Fire backs down Wash Ridge at Cataloochee. NPS Fire Effects Monitors has drastically increased. The habitat is

getting ready for the red cockaded woodpecker, thanks to a new look at some old practices with fire.



NPS Fire Effects Monitors

Fire backs down Wash Ridge at Cataloochee.



NPS Fire Effects Monitors

Fire column on Cataloochee burn site.

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## Diatoms? Why Diatoms?

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Usually the first question from an ATBI volunteer who is helping me collect algae/diatoms in Great Smoky Mountains National Park (GSMNP) is, "Why study something that you can't even see with your own eyes? Diatoms? Why diatoms?" With the invention of the microscope, Victorian gentlemen would congregate around this instrument in their parlors just to admire the jewel-like beauty and diversity of the diatom. The famous biologist Charles Darwin wrote, "Few objects are more beautiful than the minute siliceous cases of the diatomaeae."

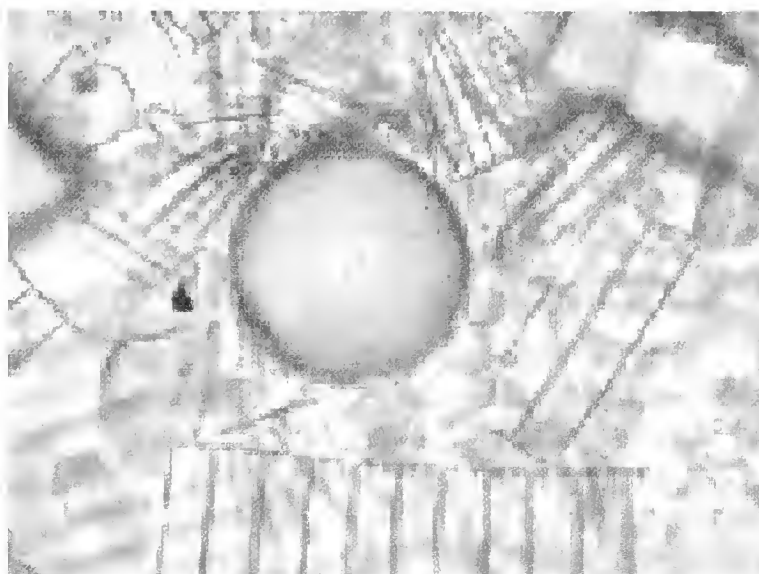
Diatoms (Class Bacillariophyta), a group of microscopic algae, are not only aesthetically beautiful, but their biological global importance is even more dramatic. Few people recognize the fact that diatoms, including both freshwater and marine, are estimated to remove nearly half of all the carbon dioxide (a greenhouse gas) from the earth's atmosphere by photosynthesis. That's more than all the tropical rain forests, temperate forests, and grasslands combined! Likewise, diatoms produce globally at least 25% of the oxygen we need to breathe!

Diatoms are utilized as environmental indicators in streams and rivers when assessing a watershed's biological integrity. Many state and federal Environmental Protection Agency staff use diatoms, along with fish and aquatic insects, to biologically monitor streams. Like fish and aquatic insects, individual species of diatoms can signal pollution. Certain species are pollution tolerant, while others are more pollution sensitive. Temperature, light levels, nutrient resources, pH, and toxic materials can also dictate diatom community distribution, and they respond quickly to environmental changes. Diatoms are an excellent biomonitor because of their short generation time, doubling their population (primarily asexually through binary fission) about once a day (that's almost 100 million in a month). Due to this short generation time, diatoms are one of the first to recolonize an area after an environmental disturbance.

As the base of the food chain, diatoms are cosmopolitan in their abundance within almost all types of aquatic habitats. Basically, wherever there is light and moisture, diatoms exist. Diatoms can live in dimmer areas than most algae because they contain carotenoids and xanthophylls, pigments which aid in photosynthesis at decreased light levels. Many diatoms can survive drought-like conditions. These aerophilic diatoms can withstand dry niches due to adaptive mechanisms, such as cell size reduction, stored chrysolaminaran (an oily food reserve characteristic of all diatoms), and motility due to an internal raphe structure (characteristic of most bilaterally symmetric diatoms), which has been shown to exude slime to push the diatom deeper into its substrate.

Within Great Smoky Mountains National Park, I have sampled creeks, streams, waterfalls, seeps, wetlands, bogs, swamps, ditches, lakes, and even slimy rock faces for my diatom research. When sampling for diatoms, one looks for yellow-brown slime. At each site, diatom slime is brushed from rocks, pipetted from sediments, and even collected from moss or liverworts.

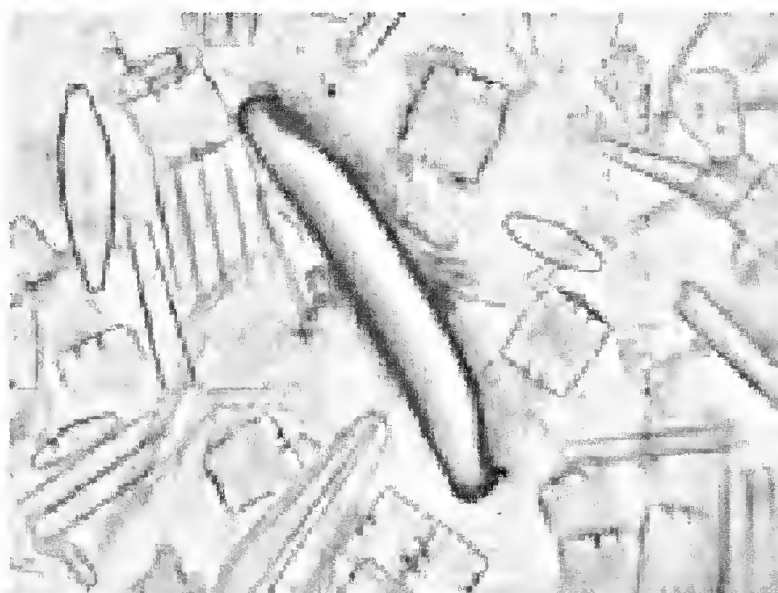




Susan Makosky, Nikon light microscope:  
magnified 1000X

Radially symmetric diatom (in center), *Orthoseira roeseana*, collected from the NC side of GSMNP from Big Creek.

My ultimate research goal is expressed best by Aldo Leopold (Sand County Almanac), "Only those who can think like a mountain, can transcend their own intermediate interests to grasp the exquisite and venerable interconnectiveness between all organisms." Since 1999 my research has added 60 published new diatom species reports for GSMNP. An additional DLIA research paper in conjunction with Dr. Rex Lowe will be published soon on the diatom genus, *Pinnularia*, which will almost double the amount of *Pinnularia* species known to GSMNP!



Susan Makosky, Nikon light microscope:  
magnified 1000X

A diverse assemblage of diatoms from the TN side of the Park from Hen Wallow Falls area.

Susan Makosky, Bowling Green State University, [scenedesmussusan@aol.com](mailto:scenedesmussusan@aol.com).

## \$60,000 in Awards Presented to ATBI Researchers

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Grant money supplied to Discover Life in America by the Great Smoky Mountains Association and Friends of Great Smoky Mountains National Park is supporting All Taxa Biodiversity Inventory research in the Park for the 2004 season. Dr. John Morse, Discover Life in America Board member and Science Committee Co-Chair, administers the grant program, now in its fifth year. The review panel included seven DLIA scientists. Requests totaled \$67,247 for the \$60,000 budgeted for this year. The granted proposals' executive summaries may be viewed on the Discover Life website: <http://www.dlia.org/>.

Fifteen proposals were funded for research which will delve into a variety of life forms in Great Smoky Mountains National Park, including aphids, ants, aquatic worms, beetles, grasshoppers, lichens, micro-fungi, fruit flies, and tardigrades. One of this year's projects involves teachers and students designing and conducting scientific research in the Park. Educational workshops and bio-quests for lichens and for Lepidoptera were funded as well. Some of the proposals are continuations of previous and ongoing work, and all are coordinated with the Discover Life in America Science Plan.

Recipients of grants will present a written and oral report of results to date at the December, 2004 annual meeting of the ATBI, with a final report by March 1, 2005. They will contribute geo-referenced data and send voucher specimens to the Park and other authorized collections. Individuals and organizations interested in assisting with the funding of future ATBI research please contact Steve Bohleber, <[steve@bohleberlaw.com](mailto:steve@bohleberlaw.com)>, DLIA Board member and chair of the Development Committee.

### Congratulations to these scientists:

**Paul Bartels**, Warren Wilson College: *Continued Inventory of Phylum Tardigrada.*

**Richard Baird**, Mississippi State University: *Microfungi of American Beech, Fraser Fir, and Eastern Hemlock.*

**Matthew Dakin**: *Survey of the Suborder Caelifera.*

**Colin Favret**, Illinois Natural History Survey: *Expanding our Knowledge of the Aphids of the Park.*

**John B. Heppner**, Florida State Collection of Arthropods: *Biodiversity of Day-flying Micro-moths of GSMNP.*

**Harold Keller**, Central Missouri State University: *Lichen Bio-Quest in Great Smoky Mountains National Park.*

**Paul Marcum**, Illinois Natural History Survey: *Search for New and Rare Vascular Plants and Lichens.*



**Michael Pogue**, Smithsonian Institution: *Noctuidae (Lepidoptera) of GSMNP*  
Edward Riley, Texas A&M University: *Continuation of Leaf Beetle Inventory*.

**Nathan Sanders**, University of Tennessee: *Ant Diversity in Great Smoky Mountains National Park*.

**Brian Scholtens**, College of Charleston: *Lepidoptera BioBlitz 2004*

**Charles Staines**: *Inventory of Five Families of Beetles (Insecta: Coleoptera) in GSMNP*.

**Gary Steck** and **Bruce Sutton**, Florida Department of Agriculture: *Tephritid Flies of Great Smoky Mountains National Park*.

**Paul Super**, Great Smoky Mountains National Park: *Teacher Enrichment Internship*.

**Mark Wetzel**, Illinois Natural History Survey: *To Continue an Inventory of Freshwater Oligochaeta (Annelida) in GSMNP*.



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## **Mycoblitz a Great Success**

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In the tradition of the butterfly blitz and the beetle blitz, mid-July saw the meeting of approximately 30 Ph.D. scientists in Great Smoky Mountains National Park (GSMNP) to conduct a fungal bioblitz. The original plan, conceived over three years ago, was modest and called for one team of a dozen scientists to come early for a Mycological Society of America (MSA) meeting in Asheville and collect in GSMNP while based at Purchase Knob. Thanks to a recently successful grant application by Ron Petersen and Karen Hughes of the University of Tennessee, there was enough money to support two teams of scientists—one on each side of the Park. The Tennessee group was referred to as the University of Tennessee team, and the North Carolina group, which had to be moved from Purchase Knob to Cosby, became known as the Cosby team (see next article).

The focus of the University of Tennessee team was on gilled mushrooms, while that of the Cosby team was a broader approach that included mushrooms with pores (no gills) and mushrooms with neither pores nor gills. Thousands of collections were made, to be taken back to research labs for intensive analysis. Preliminary analysis of the pored mushrooms found on dead wood indicates that new genera as well as many new species will be identified.

Another preliminary finding concerns mushrooms that can be very small and do not look like what most people would expect. Rather than having their spores on a pedestal, such as the gilled mushrooms (basidiomycetes), these mushrooms have their spores in sacks or asci (plural of ascus); hence they are known as

ascomycetes. Species in this group can grow on acorns, magnolia seed pods, burnt wood, on the ground, and on other fungi and insects. In addition to confirming the presence of species from many genera (i.e., *Chlorociboria*, *Daldinia*, *Hypomyces*, *Leotia*, *Microglossum*, *Otidea*, *Scutellinia*, *Spathularia*, *Xylaria*, *Wynnea*), many overlooked tiny mushrooms were collected that should lead to species newly reported to the Park and perhaps species new to science.

A highlight of the mycoblitz was the collection of unusual species that are only rarely found in the Park, for example, a blue amanita. *Amanita* is a genus often recognized because some species have warts on the cap, but blue is an uncommon color for mushrooms and very uncommon for amanitas. Collection of this specimen will provide tissue for DNA testing so as to place it in the proper systematic relationship with other members of its family. Also unusual was the collection of *Gloeocantharellus purpurescens*, which is the only mushroom to be considered for listing on the endangered species list.

Mycological studies generally require intensive microscopic examination, which will be necessary before any final conclusions can be reported. However, it appears at this time that future reports will be confirming exciting new finds in the Smokies!



Karl-Kenrik Larsson collecting fungi.



Rytas Vilgalys, Orson Miller, and Hope Miller in front of the Cosby House just before going to collect.



Pete Whelihan, Roz Lowen, and Sandy Scheine, in the Greengrier field station where lab work was done.

(All photos by the author.)

## Mycoblitz: Beating the Weather

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Jean Lodge  
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As the month ended, the Knoxville News-Sentinel newspaper lamented about the fifth wettest June on record. Nearby campground owners cried the blues as day after day brought afternoon thundershowers. But a small band of renegades was pleased, and as the pattern continued into July, they began to gather for a unique event called, appropriately, the "Mycoblitz." The intent was to take a "snapshot" census of the mushrooms and other fungi fruiting in Great Smoky Mountains National Park over a short period (July 12-14, 2004), and to augment the fungi records for the ATBI. Rain and warm weather generally bring out a flush of mushrooms, so the wishes of participants were answered.



Catherine Alme sorts collections.

Karen Hughes

Professional mycologists and amateur mushroom hunters descended on Knoxville, where Karen Hughes and Ron Petersen led "Mycoblitz I", operated out of the University of Tennessee (UT). Another, larger group of 40 professional, amateur, and student mycologists (including the Asheville Mushroom Club and two volunteers from DLIA) gathered at the Cosby campground and the new UT Greenbrier Field Station, where "Mycoblitz II" was housed. The third group of seven, led by Steve Rehner and Joey Spatafora, specialized in *Cordyceps* fungi, and converged on the Cosby motel later the same week after

searching the Cataloochee area of the National Park. There was a total of 70 participants in the three groups, many of which were world experts on certain groups of fungi, ranging from tiny, obscure black dots on rotten wood, brown spots on leaves, thin crusts on the undersides of logs, woody shelves on dead trees, to the many shapes and colors of organisms recognizable as mushrooms.



Meredith Blackwell

Coleman McCleneghan explains mushrooms. Ron Petersen in background.

The groups were international in profile. Some mycologists were already familiar with the diverse fungi of our southern mountains, while others were exposed to this rich resource for the first time. While collecting took place over only three days, the specimens will furnish material for study for months and years to come.

The "snapshot" revealed over 200 species which were immediately recognizable; a number which may be as much as 10 times higher after all identifications are in. All species are included in a database which will become part of the Park inventory. Some of the species collected were rare finds (e.g., the waxcaps, *Hygrocybe purpureofolia*, and *H. appalachianensis*), and at least one was a species new to

science (*Tomentella* n. sp., found by Urmas Koljag of Eustonia). Once collected, specimens are preserved by drying, and within a few days, these preserved specimens will be distributed to workers all over the globe. In addition to names

and voucher specimens, the experience has already spawned new interest to revisit the area by some mycologists (especially the international folks) and perhaps to repeat the event. If this should happen, mycologists will again lobby for a rainy June. Campground owners stay in touch!

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✉



Karen Hughes

Meredith Blackwell examines a specimen.

## 2004 Butterfly and Moth Blitz

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At 3:00 pm on 19 July, 2004, we poured out of the Sugarlands Training Room and fanned out to the far reaches of the Park. Our odd collecting gear, sheets and traps illuminated with mercury vapor bulbs and blacklights, were set out at more than 40 trapping stations, representing the Park's many elevations, plant communities, and forest types. The night's treasures—moths, legions of the night—were brought to Sugarlands by 8:00 am to be sorted, identified, counted, databased, and vouchered over a nonstop two-day effort. It was a focused full-throttle effort fueled by endless cups of coffee and donuts, and by the time the dust and scales had cleared on Wednesday afternoon, the sleep-deprived 40-member team had recorded and vouchered 795 moth and butterfly species.

In addition to the 10 pre-assigned taxonomic working groups (or TWIGS), volunteers and scientists were assigned to four additional teams. The geo-referencing and databasing team, headed by DLIA's Chuck Cooper and intern Jessica Brown, received and mapped all blacklight trap collections as soon as they entered the Sugarlands facility—the team also generated archival museum labels for all vouchers.

The DNA team, headed by Dr. Paul Hebert from the University of Guelph, collected single leg samples from definitively determined specimens for subsequent DNA extractions. Hebert has committed to sequencing a 700-base pair section of each moth's mitochondrial genome (COI). We estimate that sequences for some 1,000 individuals representing 642 moth and butterfly species will be posted on his "Barcodes of Life" website by September 2004 ([www.barcodinglife.com/](http://www.barcodinglife.com/)).

Rene Twarkins, a team of one, headed up the image capture effort. He worked nonstop to image more than 500 of the DNA vouchered insects, all of which will be loaded onto Hebert's website. For many species of microlepidoptera, his images will be the first and only of these species available in any printed or digital form. The cryo-preservation team, headed up by Marcia Jumblatt (University of Louisville), archived tissue from over 300 species of GSMNP Lepidoptera. These have since been deposited in the Ambrose Monell Collection for Molecular and Microbial Research, where they will be available to anyone who wishes to use the tissues.

The blitz yielded 24 new Park records, including two new family records: Opostegidae and Epipyropidae. The latter is an especially odd creature, being the Park's only ectoparasitic moth—its larvae feed externally on the bodies of plant hoppers and cicadas! Also, the beautiful olive hairstreak butterfly was added to the list. The team was struck as much by what it found as what it didn't—for example the intensive, 40-person effort failed to add any new geometrid (inchworm), slug, silk, or tiger moths. Only a single hawkmoth, the day-active hummingbird-sphinx, was added. The consensus among the scientists was that the moth and butterfly checklist for GSMNP is near completion for larger moths and butterflies, at least for mid-summer species.

The blitz added yet another new dimension—two famous authors were invited to participate: Paul Opler, author of the Peterson Field Guide to Eastern Butterflies and several other books on butterflies, and Robert Pyle, author of the Audubon Field Guide to Butterflies and more than a dozen other books. Pyle is regarded to be the founding father of the “butterfly watching” movement in the US as well as the founder of the Xerces Society, an international society committed to the conservation of invertebrates. His book Wintergreen recently won a John Burroughs Medal for nature writing. Pyle presented a splendid public lecture and is planning to write an article on the 2004 blitz for Orion Magazine.

We are especially pleased about this year’s student participation. Travel honoraria were provided to 15 students with interests in lepidopteran systematics—the youngest of which were two extremely knowledgeable high school students: Craig and Ian Segebarth, who may have known more Appalachian moths by name than any of the graduate students in attendance. The 16 or so hours logged by most of the participants in the Sugarlands Training Room proved to be incredibly fertile times for the exchange of taxonomic knowledge, life history data, and other biosystematic information—one could scarcely hope to have a better venue for the wholesale exchange of knowledge among fellow lepidopterists.

With the support of the GSMNP Resource Education Division’s Scott Pardue, six “Patio Talks” were presented to the public by Tommy Allen, James Adams, Brian Scholtens, and Sybil Bulchellit. These show-and-tell programs drew dozens of Park visitors, eager to learn about the fascinating world of moths, butterflies, and other insects, as well as to find out about the ATBI.

The tired and spent scientists, students, and staff and volunteers who trickled out of Sugarlands on Wednesday afternoon left with a tremendous sense of accomplishment: all left better lepidopterists, the Park list had grown by 24 species, more than 300 adults had been cryo-preserved, 500 adults had been imaged, and more than 4,000 specimens saved as permanent vouchers. Over the ensuing months, 642 species will be sequenced and thousands of specimens will be databased for the Park. By all accounts, this blitz proved to be a winning blend of collecting, science, training, and outreach.

Taxa Group	Total Species	Undescribed Species	DNA Vouchered Species	New Park Records
Butterflies	42	0	38	1
Primitive Moth Families	57	2	13	2
Micro-moth Families	9	0	3	2
Moth Superfamilies:				
Gelechioidea	96	2	78	10
Tortricoidea	66	0	50	1
Zygaenoidea	21	0	17	2
Pyraloidea	116	1	105	3
Geometroidea	103	0	88	
Bombycoidea	32	0	30	1
Noctuoidea	253	4	220	2
Totals	795	9	642	24





Tommy Allen and Robert Pyle at the sorting table.



DNA team headed by Paul Hebert from the University of Guelph.



Student Conservation Association intern Valeria Tayloe (L) assists Marcia Jumblatt prepare specimens.



*Callophys gryneus*, the olive hairstreak butterfly.

David L. Wagner, University of Connecticut, david.wagner@uconn.edu



## Lepidoptera Blitz at Acadia National Park

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On June 12-14, 2004, the National Park Service, the Maine Entomology Society, and the Maine Forest Service hosted 35 professional and amateur entomologists who volunteered 1,492 hours to conduct the first-ever moth and butterfly blitz at the Schoodic District of Acadia National Park, Maine. The 2,400 acre Schoodic Peninsula is the only part of Acadia National Park located on the mainland—the



remainder of the Park consists of numerous offshore islands. Schoodic boasts granite headlands, rocky intertidal habitats, coniferous forests, and elevations ranging from sea level to 440 feet. Participants sorted/identified specimens (and were housed and fed) at the Park's Schoodic and Education Center, one of 13 National Park Service Research Learning Centers.

Preliminary results from the blitz recorded 18 butterfly and 128 moth species plus another 20-30 additional moth species which will require additional taxonomic work. One of these species is possibly undescribed. Considering that the blitz took place during late spring/early summer and that nighttime temperatures were in the mid 40's, participants were very pleased with the recorded species diversity. We had two very qualified taxonomists leading the blitz: Brian Scholtens from the University of Charleston, SC, and Reggie Webster from Fredrickton, New Brunswick, Canada. The event was extensively covered by local media, including filming by the Maine Public TV science series "Quest". They will be producing a program on our blitz for broadcast next winter.

To date, vouchers of about 80% of the collected species have been deposited in the William Otis Sawtelle Collections and Research Center, and Acadia National Park's museum collection facility. Given the interest and success of this blitz, Park staff and the Maine Entomology Society are hoping to conduct future annual collecting efforts for Lepidoptera and/or other invertebrate species at Acadia National Park.



Lepidoptera Blitz participants sorting.



Artistic scientist preparing a watercolor.  
(All photos courtesy of David Manski.)

*David Manski, Acadia National Park,*  
David\_Manski@nps.gov. ☞



Brian Scholtens sorting.

## **National Science Foundation Funds Research Experience for Teachers**

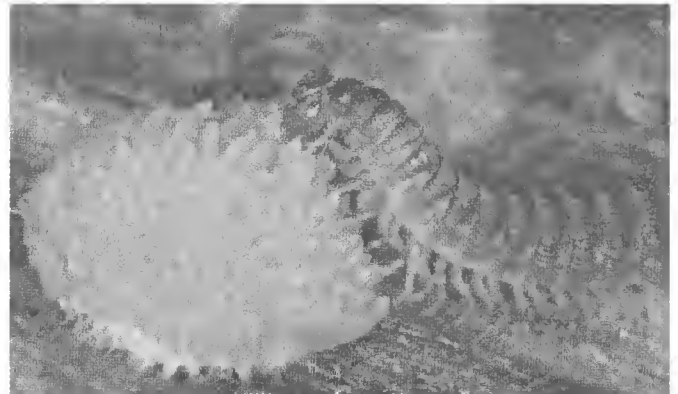
Patricia A. Smith  
Life Science  
Warrensburg Middle School  
640 E. Gay Street  
Warrensburg, MO 64093

Recently, I was invited by Harold Keller of Central Missouri State University to apply for a supplemental Research Experience for Teachers grant to accompany his NSF grant entitled "Biodiversity and Ecology of Tree Canopy Biota in the Great Smoky Mountains National Park." I am a seventh grade life science teacher from Warrensburg, Missouri. With the cooperation of Discover Life in America, my husband Stan (also an educator) and I stayed at Cosby during late June and began what can only be called an exciting field experience in GSMNP! We began documenting Keller's research project in Warrensburg with interviews and photographs of the student climbers learning the double rope tree climbing technique, which was part of a tree climbing school. We also attended introductory seminars on entomology, ecology of the GSMNP, field techniques and tools, and sampling protocols. The days and evenings in the Smokies were filled with learning about the different organisms collected, exploring several locales of the GSMNP, acting as ground crew for the climbers, and documenting the procedures and experiences of the research team.

I was able to use this experience to increase my own knowledge of myxomycetes, lichens, and insects, and to broaden my field research skills. It was an exciting beginning to learn how to locate and recognize myxomycetes in the field! I am now working to create a two-tiered website that will allow

worldwide access to the field experiences of tree canopy research and also allow my secondary students the opportunity to conduct parallel field research in our outdoor laboratory at Pertle Springs near the University campus. The website activities will mirror the three phases of Keller's original project: the Adventure Phase, the Laboratory Phase, and the Publication Phase. Anyone who visits this future website will be able to experience a virtual I-ADVENTURE of tree canopy research and get a good understanding of what the ATBI is all about. Interested student groups can then choose to continue to the second tier of the web activities and conduct similar field research in their region.

Back at Pertle Springs, my seventh grade class will be collecting bark samples from living trees and will install flight intercept traps to collect insects. Moist chamber cultures of bark samples will enable students to observe a living miniature ecosystem composed of myxomycetes, fungi, lichens, mosses, liverworts, algae, cyanobacteria, myxobacteria, tardigrades, insects, nematodes, and possibly other invertebrates. This website experience will encourage other secondary students, in Warrensburg and beyond, to choose some form of field biology as their future career.



Millipede feeding on *Tubifera ferruginosa*.

Left: Central Missouri State University students climbing to the canopy.

(Photos courtesy of Trish Smith.)

Patricia A. Smith, [tssci@earthlink.net](mailto:tssci@earthlink.net)

Undergraduate biology majors and graduate students are needed for a tree canopy biodiversity research project in the Great Smoky Mountains National Park. The objective of this research project is to complete the first comprehensive survey and inventory of tree canopy biota including Myxomycetes, macrofungi, mosses, liverworts, lichens, ferns, insects, and molluscs in the Great Smoky Mountains National Park (GSMNP).

Financial support is available through several grants, including the National Geographic Society and a National Science Foundation grant entitled "RUI: Biodiversity and Ecology of Tree Canopy Biota in the Great Smoky Mountains National Park." Research and teaching graduate assistantships are available based on academic credentials and availability of funds. Experience with spreadsheet databases, computer word processing software, GPS units, digital camera and some understanding of statistical analysis will bode well for selection of candidates.

Please contact Professor Harold W. Keller, Ph.D., Department of Biology, 118 W.C. Morris Building, Central Missouri State University, Warrensburg, MO 64093, telephone 660-543-4823; fax 660-543-4355; [keller@cmsu1.cmsu.edu](mailto:keller@cmsu1.cmsu.edu).



## Mayfly (Ephemeroptera) Diversity in the Great Smoky Mountains

Luke M. Jacobus and W. P. McCafferty  
W. P. McCafferty  
Department of Entomology  
Purdue University  
West Lafayette, IN 47907

As part of our inventory of mayflies, seasonal sampling trips were made during May, June, August, September, and December. Also, we have received samples taken in additional months by volunteers and other entomologists. Presently, we have confirmed the presence of 112 species representing 36 genera and 12 families (Ameletidae, Baetidae, Baetiscidae, Caenidae, Ephemerellidae, Ephemeridae, Heptageniidae, Isonychiidae, Leptophlebiidae, Neoephemeridae, Potamanthidae, and Siphonuridae). Here we highlight some genera with the greatest diversity in the Park. For more general information about mayflies, see our article in the *Southeastern Biology*, Volume 50, pages 358-360.

Species of the genus *Ephemerella* (family Ephemerellidae - spiny crawler mayflies) fill a range of niches in flowing water habitats. The genus is distributed throughout North America, Europe, and Asia, with a center of diversity in the Blue Ridge Mountains of the Southern Appalachians. Material collected during the ATBI was therefore of critical importance to a recent taxonomic revision of this genus in North America. Seven of the ten known eastern North American species (a much smaller number of valid species than previously thought) have been identified from the Park. Large numbers of *Ephemerella subvaria* larvae (pictured) can be collected from Deep Creek and Abrams Creek during the fall and winter months. It is one of the first species to emerge in the springtime and has long been a favorite of early-season fly fishers.

Adult males of the genus *Isonychia* (family Isonychiidae - brushlegged mayflies) have been dubbed White-gloved Howdys because of their white tipped forelegs, although fly fishers more commonly refer to these moderately sized mayflies as Mahogany Duns. Larvae frequent stream and river riffles where they face into the current and use hairs on their forelegs to filter out small food items. The genus is known from North America and Asia. One notable Park record is

*Isonychia hoffmani*, known previously from only a few locales in Virginia and West Virginia.

The genus *Maccaffertium* (family Heptageniidae - flatheaded mayflies) recently has been raised from subgeneric status under *Stenonema*. Species are moderate to large in size and are among the most common mayflies in eastern North America. The extremely flattened, sprawling larvae often are found on the bottoms and sides of rocks and debris in slower reaches of streams. The genus is endemic to North America, and 11 of the 16 species have been confirmed from the Park.



Larvae of the genus *Plauditus* (family Baetidae--small minnow mayflies) are adapted for residing on mixed substrates in moderate to fast currents. They are sleek and highly streamlined in shape, and are referred to as "two-tailed nymphs" because their middle tail is greatly reduced. They usually are less than 5 mm long. The winged stages sometimes are referred to as Blue-winged Olives. *Plauditus* is endemic to North America, and a concentration of diversity is found in the Park and surrounding areas. *Plauditus* species are among the most difficult mayflies to identify. Perhaps a comparative study of these mayflies in Great Smoky Mountains National Park will provide clues for improving their taxonomy.

*Ephemerella subvaria*, male larva (photo by McCafferty).

Luke M. Jacobus, Purdue University, [konchu@purdue.edu](mailto:konchu@purdue.edu)

Visit MAYFLY CENTRAL on the World Wide Web:

(<http://www.entm.purdue.edu/entomology/research/mayfly/mayfly.html>)

## NEWS OF BIOLOGY IN THE SOUTHEAST

Leon Jernigan—News Editor  
Department of Biology  
University of North Carolina  
Pembroke, NC 28372-1510

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Wilson Dam on the Tennessee River.



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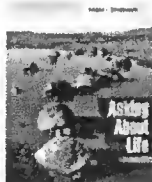
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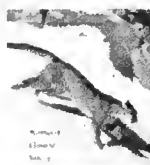
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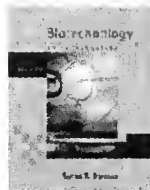
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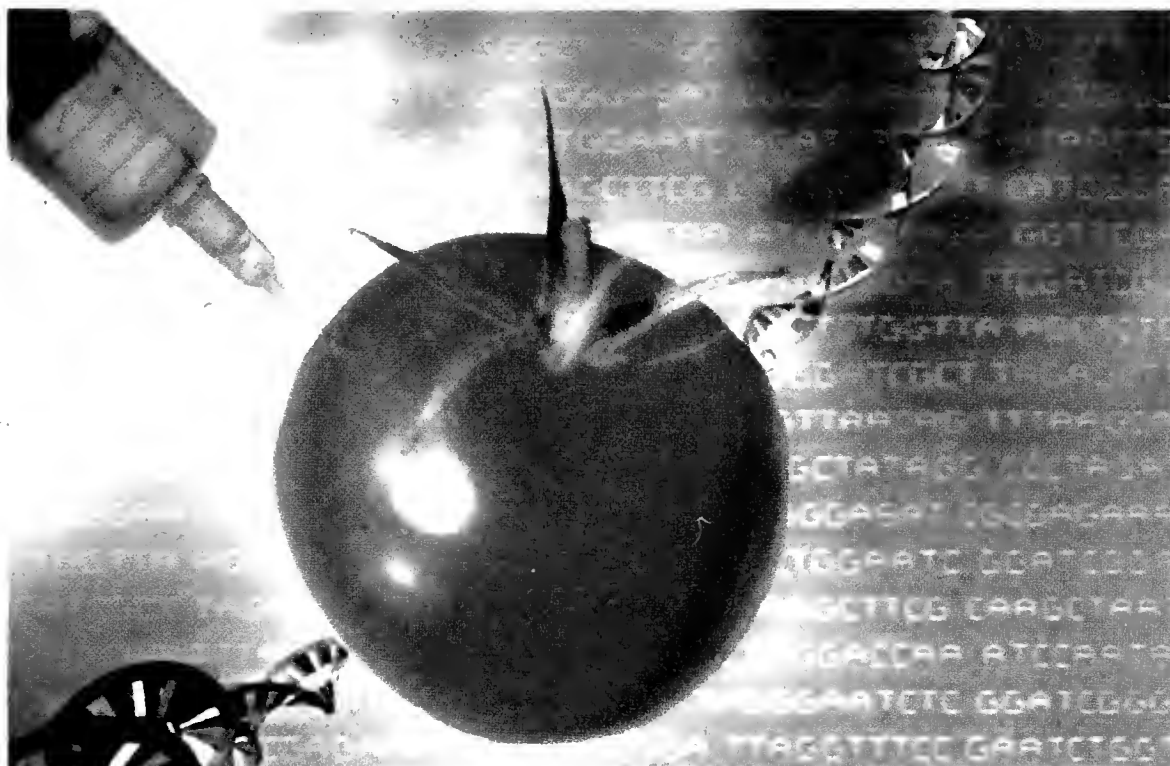
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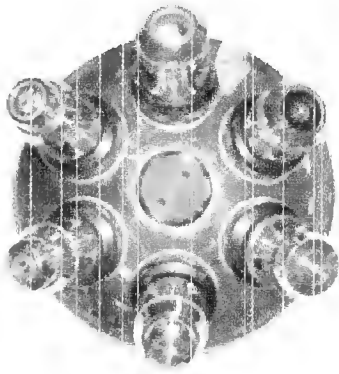
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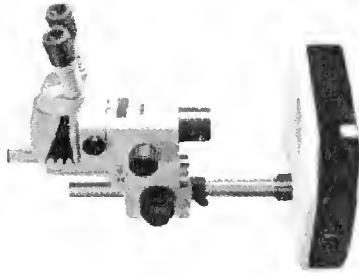


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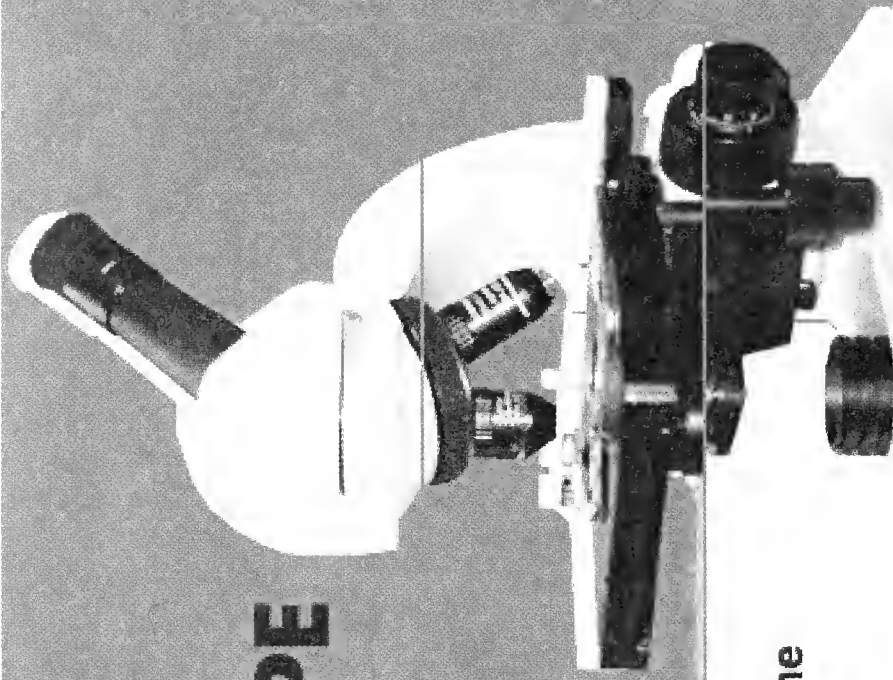


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